# Scoring Human Decomposition From Photographs: A Validation Study

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## Introduction

Forensic anthropologists work with law enforcement and medical examiners to help identify skeletonized remains. Anthropological analyses of skeletal remains can include:

- Developing a biological profile (estimating the sex, age and stature)
- Trauma assessment
- *Post mortem interval* – or how long since the individual died.

The *post mortem interval* is typically estimated by visually assessing the body for the extent of decomposition. Megyesi et al. (2005) is the most widely used method for assessing human decomposition.

The body is divided into three portions: head and neck, trunk, and limbs (**Fig. 1**), which are individually assigned a score based on the presence or absence of listed criteria (**Fig. 2**). The scores are summed to provide a total body score (TBS) that correlates to an estimated post mortem stage.

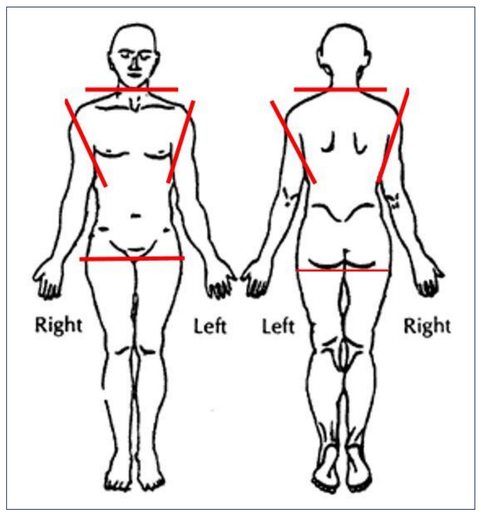


**Figure 1.** Divisions of the body for decomposition scoring according the Megyesi et al. 2005.

A. Fresh
(1pt) 1. Fresh, no discoloration

B. Early decomposition
(2pts) 1. Pink-white appearance with skin slippage and some hair loss.
(3pts) 2. Gray to green discoloration: some flesh still relatively fresh.
(4pts) 3. Discoloration and/or brownish shades particularly at edges, drying of nose, ears and lips.
(5pts) 4. Purging of decompositional fluids out of eyes, ears, nose, mouth, some bloating of neck and face may be present.
(6pts) 5. Brown to black discoloration of flesh.

C. Advanced decomposition
(7pts) 1. Caving in of the flesh and tissues of eyes and throat.
(8pts) 2. Moist decomposition with bone exposure less than one half that of the area being scored.
(9pts) 3. Mummification with bone exposure less than one half that of the area being scored.

D. Skeletonization
(10pts) 1. Bone exposure of more than half of the area being scored with greasy substances and decomposed tissue.
(11pts) 2. Bone exposure of more than half the area being scored with desiccated or mummified tissue.
(12pts) 3. Bones largely dry, but retaining some grease.
(13pts) 4. Dry bone.

**Figure 2.** Criteria to score head/neck region, from Megyesi et al. 2005.

## Purpose, Goals & Objectives

While the Megyesi et al. (2005) method was designed for field use, anthropologists frequently receive photographs of decomposing from law enforcement agencies requesting an estimation of time since death.

The purpose of this study is to determine whether decomposition scoring is as accurate from a photograph, as it is from scoring a body in the field. The goal of this study aims to test the accuracy of decomposition scoring from a photograph compared to scores taken in the field.

## Methods and Materials

Research took place at the Anthropological Research Facility (ARF), which is part of the Department of Anthropology at the University of Tennessee, Knoxville.

- The photographs used for this study derive from two current National Institute of Justice research projects[3,4] underway at the research facility.
- 11 individuals were photographed and scored in the field every 5 days for 60 days.
- The photographs were randomized by individual and date.
- The photographs were scored according to Megyesi et al. 2005.
- To address intra-observer error, each photograph was scored three times.
- The data were analyzed using a paired sample t-test.
- Significance was set at p=0.05.

**Table 1.** Paired Samples T-Test Comparing Trials 1, 2, and 3, and each trial to the Field Assessment Scores.

| | Mean | Std. Deviation | Sig. ($p \leq 0.05$) |
|---|---|---|---|
| Trial 1-Trial 2 | -.2418 | 1.6679 | .112 |
| Trial 1-Trial 3 | -.5246 | 1.6171 | .000 |
| Trial 2-Trial 3 | -.2828 | 1.3936 | .027 |
| Trial 1- Field | .3566 | 2.2180 | .078 |
| Trial 2-Field | .5984 | 2.2733 | .004 |
| Trial 3-Field | .8811 | 2.1590 | .000 |

## Results

Intra-Observer Error

- *No* significant difference was found between Trial 1 and Trial 2.
- Significant differences (p = .027) were found between scores from Trial 2 and Trial 3.
- Significant differences (p = .000) were found between scores from Trial 1 and Trial 3.

The intra-observer error analysis suggests the presence of a learning curve occurring between the first and third trial.

Photograph Scores to Field Scores

- *No* significant difference was found between Trial 1 and the field scores.
- Significant differences were found between scores from Trial 2 and the field scores.
- Significant differences wee found between scores from Trial 3 and the field scores.

The comparison suggests there is a difference between scores done from photographs and those done in the field.

## Discussion and Conclusion

The results indicate that scores from photographs are different enough from the field scores to reach a level of significance.

There are a number of possible reasons for this:

- The total body scores from the field came from a third party.
  - Individuals may give the same body different scores based on level of experience.
- Difficulty judging the state of decomposition of bodies placed in the prone position—or on their stomach.
- Poor picture quality
  - Portions of the body were often missing from the photo.
  - Coloration or shadowing on the photograph
  - Poor resolution

Future Studies

- Addition of an inter-observer component to address inter-observer error.
- Improve the quality of photos

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## References

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